

Shin WATANABE*: *Schizochlamydelia sphaerica* sp. nov.
(Chlorococcales) from Japanese soil

渡辺 信*: クロロコックム目の 1 新種 *Schizochlamydelia sphaerica*

The organism to be described in this paper was isolated from wet sandy soil at the bank of the Yodo River running through Yawata Town in the southern part of Kyoto Prefecture, where *Solidago altissima* occupied dominantly. The organism was isolated by the methods reported previously (Watanabe 1977) and axenified by the methods of Archibald and Bold (1970). It grew well both in the Bold's basal medium solidified with 1.5% agar (BBM agar) and in the BBM agar containing 1/5 strength sea water (BBM+seawater agar). This isolate is solitary and the cells are spherical, covered by individual matrix, having a mantle-shaped chloroplast with pyrenoids and reproduces only by autospores. These characteristics indicate that the isolate belongs to the genus *Schizochlamydelia* (Palmogloeaceae, Chlorococcales, Chlorophyta).

A culture of the newly described organism has been deposited in the Culture Collection of Algae, Institute of Applied Microbiology, University of Tokyo.

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***Schizochlamydelia sphaerica* S. Watanabe sp. nov. (Figs. 1-15)**

Cellulae adultae sphaericae; cellulae iuvenes et autosporae subsphaericae, ellipsoideae. Membrana tenuis, interdum ad paginam membranae praesentia hyaline pallentia, verruciformia puncta. Cellulae circumcinctae matrice propria, et matrix communis carens. Cellulae sine matrice $2 \times 3 \mu\text{m}$ ad $8 \mu\text{m}$ diametro. Matrix propria usque ad $6 \mu\text{m}$ crassa in cultura vetere. Chloro-

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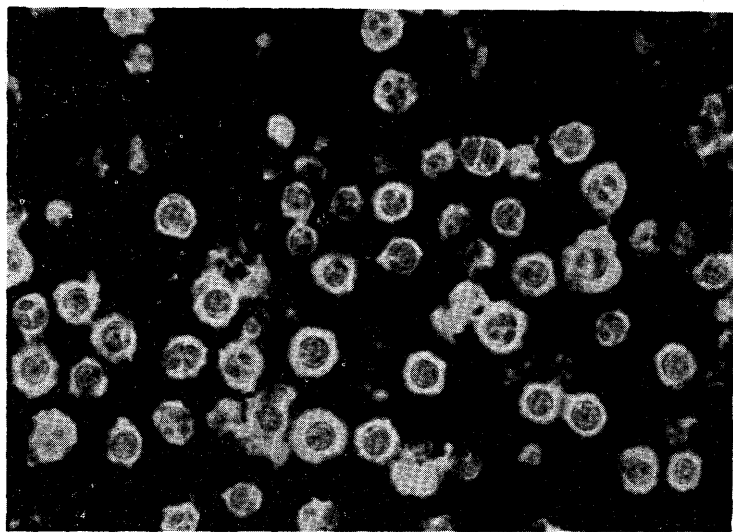


Fig. 1. *Schizochlamydesphaerica* sp. nov. India ink preparation to show the absence of common matrix. $\times 380$.

plastus cupulatus, olliformis, margine profunde fisso in 2-3 punctis, interdum ponticulum faciens. Pyrenoides singula interdum plures, sphaericae, ellipsoideae, tectae duobus vel tribus granis amyli acetabuliformibus, in parte basali chloroplasti. Nucleus et nucleolus visibiles. Vacuolae absentes. Guttulae olei praesentes.

Reproductio 2-8 autosporis. Autosporae aequales magnitudine in sporangio. Membrana matris et matrix propria pariter profunde rumpunt.

Massa plantae viridis, laevis, et mucosa in cultura vetere.

Origo: Plantae e solo ripae fluvii in loco Yawata-cho, Kyoto-fu dicto; m. Feb., 1972 lecto; numerus culturae YAW-10.

Holotypus: Figs. 1-15.

The alga grows well on both BBM agar and BBM+seawater agar. Plant mass is green, smooth, and slimy in old cultures. Shapes of young vegetative cells and just liberated autospores are subspherical or ellipsoidal, becoming spherical with cell growth. In actively growing cultures, the gelatinous matrix is generally thin, but it becomes thicker and the plant mass becomes slimy as they grow older. Observation after staining with methy-

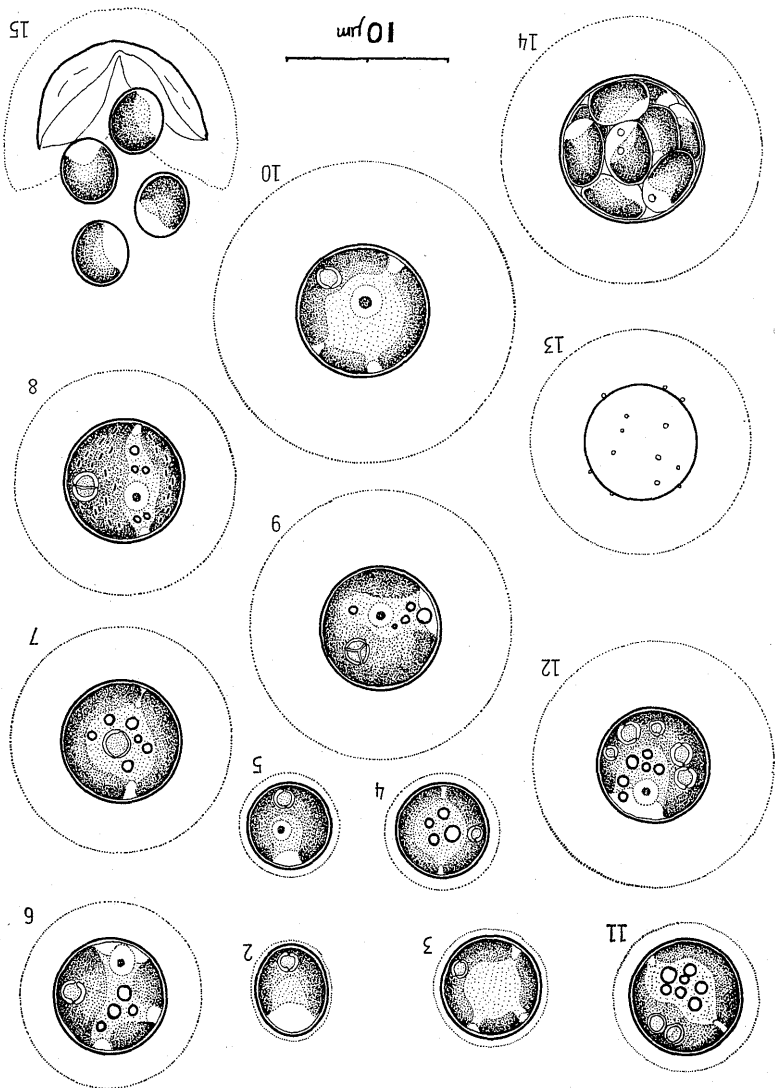
lene blue or India ink shows that the cells are free from each other being enveloped in their individual matrix, and that the common matrix is absolutely lacking (Fig. 1). The individual matrix of this isolate breaks down at the time when the mother cell wall bursts open. Young vegetative cells are $2 \times 3 \mu\text{m}$ in size at a minimum and adult cells reach $8 \mu\text{m}$ in diameter excluding individual matrices. An individual matrix is as thick as $6 \mu\text{m}$ in old cultures.

The wall of cells in young cultures is generally smooth, but small wart-like spots are sometimes found on the surface of the cell wall in one-month-old cultures. These spots are transparently pale in color, and occur inconstantly and irregularly. Even in old cultures some cells possess a smooth wall without spots, while others are covered by so numerous spots. The spots are sometimes found even on the cell wall of autospores in a sporangium.

The chloroplast in young vegetative cells is cup-shaped, but in adult cells it becomes mantle-shaped with a margin which is deeply cloven at two to three points, often showing a bridge-like appearance. The pyrenoid is single or several in number and spherical or ellipsoidal in shape and is located at the basal part of the chloroplast. Starch grains around the pyrenoid are two or three in number, forming a saucer-shape in outline. One nucleus with one nucleolus is observable in living cells. Vacuoles are absent. Oil droplets tend to increase in number with cultural age. Two to eight autospores which are almost equal in size are formed in a sporangium.

Schizochlamydeella sphaerica is similar to *S. solitaria* (Smith, 1922; Fott, 1974), but differs from it in the following characters; in the former the cell wall is smooth, sometimes rough with wart-like spots on the outer surface but not producing nodules on the inner surface, and the daughter cells become free from the mother cell wall shortly after their liberation, while in the latter, it is smooth on the outer surface but with a single thickened nodule on the inner surface that usually lies opposite the apex of the cup-shaped chloroplast, and the daughter cells and mother cell wall cohere after the liberation.

S. sphaerica seems to resemble *Chlorella capsulata* described by Guillard, Bold and Mac Entee (1975) on the basis of the specimens collected from brackish water in Sarasota County, Florida, U.S.A. After the examination



Figs. 2-15. *Schizochlamydia sphaerica* sp. nov. Figs. 2-5, young vegetative cells with thin individual matrices in actively growing culture. Figs. 6-10, adult cells with thick individual matrices. Figs. 11-12, adult cells with plural pyrenoids. Fig. 13, surface view of the cell with wart-like spots. Fig. 14, a mother cell with autospores. Fig. 15, an empty mother cell wall and just liberated autospores.

of the culture specimen of this species (Texas Culture Collection No. 2074), it became clear that the present new species is distinguished from it in the following characters; in the present species, the cell is spherical, the chloroplast is mantle-shaped and the wall of the mother cell deeply split to form two hemispherical fragments when discharging autospores, whereas in *Chlorella capsulata*, the cell is ellipsoidal, the chloroplast is broad band-shaped or girdle-shaped and the wall does not split deeply and is left in pouch-like shape. In addition to the morphological aspects, the differences of the physiological characters should also be pointed out: the present species was found in fresh water and grew well on both culture media, BBM agar and BBM+seawater agar, while *C. capsulata* was in brackish water and grew on BBM+seawater agar but not on BBM agar.

As for *Chlorella capsulata*, the following treatment should be necessary in connection with the taxonomic attribute. Like present new species, it produces individual gelatinous matrix around the cell surface. According to the circumscription given by Fott and Nováková (1969), the absence of the gelatinous matrix is one of the diagnostic criteria for the genus *Chlorella*. Taking into consideration of this morphological feature, I would like to propose the following new combination for this alga.

Schizochlamydelia capsulata (Guillard, Bold et MacEntee) S. Watanabe comb. nov.

Basionym: *Chlorella capsulata* Guillard, Bold et MacEntee, in *Phycologia*, 14: 12-24, f. 21-24. 1975.

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京都府南部八幡町に流れる淀川の河川敷土壌から分離した緑藻の 1 種は単細胞性で、細胞はゼラチン質に包まれるが、群体を形成しない。葉緑体にはピレノイドをもち生殖は自生孢子による。これらの特徴はクロロコックム目、*Palmogloea* 科の *Schizochlamydelia* 属の一員であることを示すが、細胞壁の内側が平坦で自生孢子は母細胞の細胞壁に付着しないという特徴により、細胞壁の内側に乳頭状突起を形成し自生孢子は母細胞の細胞壁に付着するという特徴をもつ唯一の既知種、*S. solitaria* とは異っている。分離株はまた米国、フロリダの汽水域から記載された *Chlorella capsulata* によく似ているので比較した。分離株の細胞は球型で、葉緑体はマント形であり、母細胞は娘細胞を放出後深く割れて二つの半球となって残るが、*C. capsulata* の細胞は楕円型で、葉緑体は巾の広いバンド形か girdle 形であり、母細胞は一部だけ破れて袋状

として残る形質をもつことがわかった。そこで今回の分離種は新種と認め、**Schizochlamydelia sphaerica** S. Watanabe の名称を与えた。また Fott & Nováková (1969) は *Chlorella* 属はゼラチン質を欠くと特徴づけているので、これに従い、*C. capsulata* は属を移動し、**Schizochlamydelia capsulata** (Guillard, Bold et Mac Entee) comb. nov. の新組合せを提案した。

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□井上 浩：続日本産苔類図鑑 i~viii, 1~193, 1976年11月, 築地書館 11,000 円。

本書は絶賛を博した「日本産苔類図鑑」の続巻で、前著と同じスタイルで78種の苔類が扱われている。今回は葉状性の種も多く取りあげられており、苔類の蠱惑的な多様な世界が見事に描き出されている。苔類の形態は細部に至るまで存外に規則的であり、その写生図は一画といえどもおろそかにできないが、従来の諸家の図には、観察の不足や描画の技術の拙劣さから、本書の図に比肩する正確で美しいものはほとんどない。多年にわたる精力的な研究によって培われた著者の眼力は確かであり、傑出した描画技術と相俟って、進捗著しい現代の苔類分類学の要求に応える、優れたイコネスを生み出した著者の努力に対して深甚の敬意を表したい。また、分類学的な問題点を剔出する著者の才能は抜群であり、本書の解説記事（英文）には、新亜目、新科、新亜科、新亜属を含めオリジナルな見解が枚挙にいとまがないほど数多く盛り込まれている。続巻も前著と同じ体裁の豪華本でかなり高価であるが、萌黄色と縹色の上品なコントラストをなす正統2巻はいかにも垢抜けしたデザインで、内容ばかりでなく外観もまことに秀逸であり、計2万円をはたいてもぜひ購入したくなる魅力をそなえている。なお、本書に関する詳しい書評は「藓苔地衣雑報」に投稿中である。（北川尚史）